United States Patent [19]

Brush

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[54] **ELECTRICAL CONNECTOR INSERT RETAINER**

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[52] **U.S. Cl.** ..... **339/176 M**

[51] **Int. Cl.** **H01r 13/50**

[58] **Field of Search**...339/89 R, 89 M, 89 C, 136 R, 339/136 M, 136 S, 140 R, 140 C, 141, 142 R, 143 R, 176 R, 176 M, 176 L, 218 R, 218 M, 218 L

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[57] **ABSTRACT**

A quick-connect electrical connector for connecting together a plurality of electrical conductors. The connector includes an insert retainer (1) that adapts an oversized insert (10) to a standard size electrical connector shell (100).

4 Claims, 3 Drawing Figures

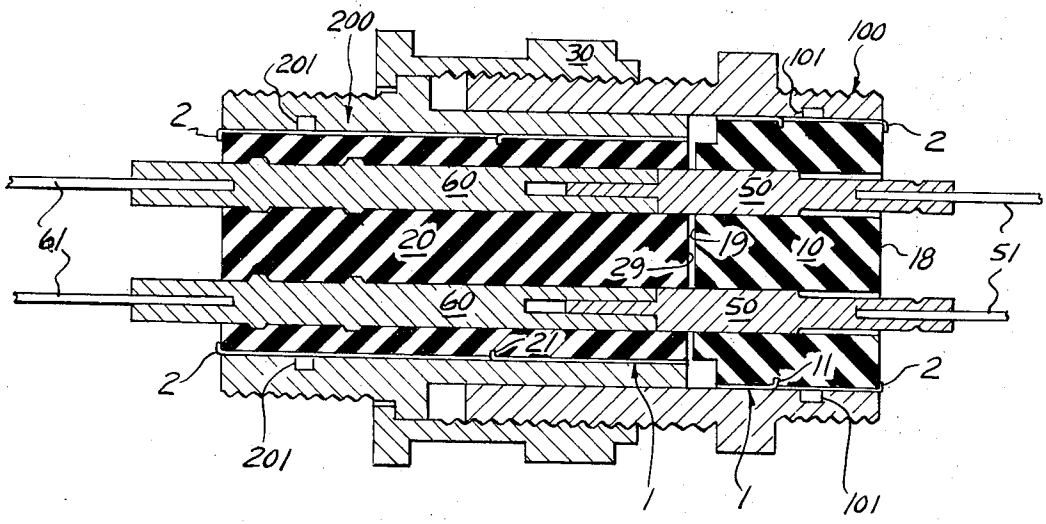


FIG. 2

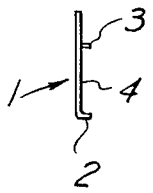
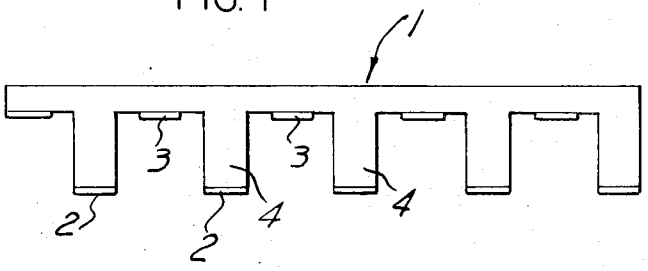


FIG. 1



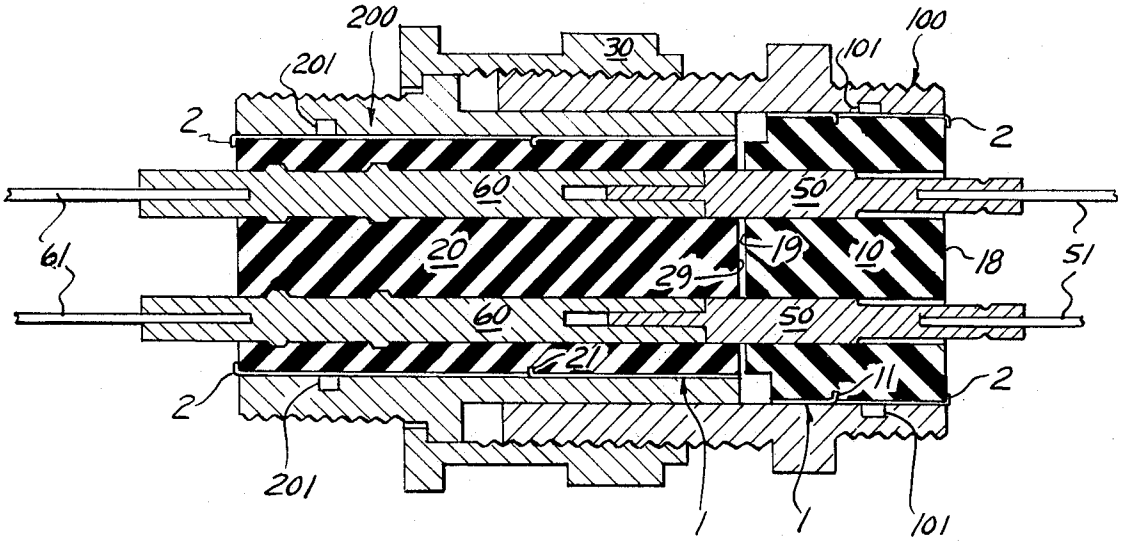


FIG. 3

ELECTRICAL CONNECTOR INSERT RETAINER

BACKGROUND OF THE INVENTION

This invention is concerned with coupling devices commonly referred to as quick-connect electrical connectors. More specifically, it is concerned with a connector assembly that includes an insert retainer that allows standard size connector housings to use oversized inserts.

Electrical connector assemblies conventionally include a plug and receptacle, each of which has an insert of dielectric material provided with multiple openings within which electrical contacts are retained. The insert is introduced from the rearward end of a metallic shell where it is held in place by means of a nut.

There is a continuing need for making electrical connector assemblies as versatile as possible so as to reduce wasteful practices that increase the cost of the connector. The Government, in an effort to eliminate wasteful practices, has promulgated standards for electrical connectors that require standard components. However, in the past, the elements which make up an electrical connector i.e., shell, insert and contacts, are not necessarily interchangeable because of size differences. For instance, although contacts may be interchangeable in different sized connectors, the shell and insert are not because of different diameters. Therefore, it is necessary to stock two different sized shells and two different sized inserts for two different standard sized connectors.

SUMMARY OF THE INVENTION

This invention provides an insert retainer for a connector assembly that allows the same size shell to be used with two different sized connector inserts.

The invention is an electrical connector assembly characterized by an insert retainer (1) that retains an insert (10) in a connector shell (100) which would normally be too small to retain the insert (10).

In one embodiment of the invention, an electrical connector assembly of the type having a housing (100) and an insert (10) disposed in the housing includes an insert retainer for retaining the insert (10) within the housing (100), the insert retainer comprising: a sleeve (1) having a central axis and a plurality of axially extending fingers (4) disposed around the periphery of one end of the sleeve (1), each of the fingers (4) terminating in an end portion that includes a radial projection (2) that extends in the direction of the central axis of the sleeve; and at least one other radial projection (3) that extends in the direction of the central axis of the sleeve (1), said at least one other projection (3) axially spaced from the projections (2) at the ends of the fingers (4).

Accordingly, it is an object of this invention to provide an insert retainer that adapts a smaller sized insert to a larger sized connector shell.

It is another object of this invention to provide an improved electrical connector assembly.

It is a further object of this invention to provide a means for axially locating a connector insert within a connector housing.

The above and other objects and features of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings and claims which form a part of this specification. Further, the use of numerals in any portion of the specification is for the purpose of facilitating an understanding of the invention and is not intended to limit the scope of the invention to the specific embodiments referenced.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates an insert retainer.

FIG. 2 is a side view of the insert retainer shown in FIG. 1.

FIG. 3 is a cross-sectional view of a connector assembly incorporating the principles of this invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now to the drawings, FIG. 1 illustrates an insert retainer for an electrical connector assembly. The insert retainer is generally a sleeve, which is the same configuration as the insert, and is shown in a projected view to illustrate the features of the insert retainer. The insert retainer generally comprises a sleeve 1 which includes a plurality of axially extending fingers 4 disposed in spaced relationship around the periphery of one end of the sleeve 1. Each of the fingers 4 includes an end portion that has a projection 2 thereon that extends from the finger 4. Spaced from the projection 2 on the end of the fingers 4 are other porjections 3. When the sleeve 1 is mounted around an insert (not shown), the projections 2 and 3 extend radially inwardly towards the central axis of the sleeve.

FIG. 2 illustrates an end view of the insert retainer shown in FIG. 1. This view illustrates that the projections 2 and 3 extend away from the fingers 4 in the same direction.

FIG. 3 illustrates a connector assembly which utilizes the insert retainer 10 in both the plug 200 and the receptacle 100 portion of the connector assembly. A connector assembly generally includes a plug 200, receptacle 100 and a coupling nut 30 which retains the plug and receptacle together once the contacts therein are mated.

The receptacle 100 portion of the electrical connector assembly includes an insert 10 mounted within the receptacle 100, and a plurality of contacts 50 mounted in the insert.

The insert 10 includes: a front face 19; a rear face 18; a plurality of bores 17, extending through the insert 10 from the front face 19 to the rear face 18; and an annular recess 11 around a portion of the outside surface of the insert 10.

Disposed around the insert 10 is the insert retainer. The insert retainer is arranged around the insert 10 so that the projections 3 extend into the recess 11 in the insert 10; and so that the projections 2 extend over a portion of the rear face 18 of the insert 10. The projections 2 and 3 allow the sleeve 1 to lock onto the insert 10 and precisely located the insert within the connector shell 100.

The shell or receptacle 100 portion of the connector assembly includes an annular recess 101 around the inside portion of the receptacle 100. The recess 101 provides a path between the fingers 4 of the insert retainer so that an epoxy resin, injected between the fingers, to bond the insert retainer and insert to the receptacle 100 may flow behind the insert retainer fingers 4.

When the insert and insert retainer are assembled into the receptcale 100, it is preferred that a liquid epoxy be injected into the receptacle recess 101 and between the fingers 4 so that when the epoxy cures to

the rigid state, the insert, the insert retainer and the receptacle shell **100** are bonded together. It is the function of the insert fingers **4** to keep a portion of the insert **10** spaced from the inner wall of the shell **100** so that a liquid epoxy may be injected into the recesses **101** or **201**, whereby the curing of the epoxy will bond the insert **10**, the insert retainer **1**, and the shell **100** together.

The plug **200** portion of the connector assembly may be similarly assembled. As can be seen in FIG. **3**, the plug shell **200** includes an annular groove **201** around the periphery thereof for receiving a bonding agent and the insert **20** includes an annular groove **21** around the periphery thereof for receiving the projections **3** which extend radially from the sleeve **1** mounted around the insert **20**.

While a preferred embodiment of the invention has been disclosed, it will be apparent to those skilled in the art that changes may be made in the invention as set forth in the appended claims and, in some instances, certain features of the invention may be used to advantage without corresponding use of other features. Accordingly, it is intended that the illustrative and descriptive materials herein be used to illustrate the principles of the invention and not to limit the scope thereof.

Having described the invention, what is claimed is:

1. In a connector assembly, the combination comprising:

a shell having a forward end, a rear end, and a central passage therethrough;

an insert having a front face, a rear face, a groove around the outside of the insert between the front face of the rear face, and a plurality of axially aligned passages extending between said front face and said rear face;

a plurality of electrical contacts, each mounted in a respective passage in said insert; and

means for mounting said insert in said shell, said mounting means including:

a sleeve mounted around the outside of the insert between the front face and the rear face, the sleeve disposed in the central passage of said shell, said sleeve including:

a plurality of axially extending fingers disposed in spaced relationship around the periphery of one end of said sleeve and extending in the direction of the rear end of said shell;

a projection extending from said sleeve in the direction of the central axis of said shell, said projection adapted to mate with the groove in said insert; and

means for bonding said insert, sleeve and shell together, said bonding means disposed in the spaces between the axially extending fingers.

2. The connector assembly recited in claim **1** wherein said shell includes a groove in the inside portion of said shell, said groove in said shell disposed adjacent the rear end of said shell so that each of the spaces between said axially extending fingers of said sleeve are connected together by a respective portion of said groove in said shell.

3. In combination with an electrical connector of the type having a housing and an insert disposed in said housing, the improvement comprising an insert retainer for retaining said insert within said housing, said insert retainer comprising:

a sleeve having a central axis and a plurality of axially extending fingers disposed around the periphery of one end of said sleeve, each of said fingers terminating in an end portion that includes a radial projection that extends in the direction of the central axis of said sleeve.

4. The combination recited in claim **3** wherein said sleeve includes at least one other radial projection that extends in the direction of the central axis of said sleeve, said at least one other projection axially spaced from said projections at the ends of said fingers.

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